ZF FRIEDRICHSHAFEN AG
Friedrichshafen

PCT/EP 03/10759
Akte 8520 WO
TS pa
2004-11-22

Patent Claims

1. Device for the optimization of hydraulically controlled engagement of marine transmission clutches comprising a pump (10) for the delivery of hydraulic fluid from a reservoir (11) to two control pistons (12a, 12b) of said clutches, two solenoid valves (13, 14) arranged between said pump (10) and said pistons (12a, 12b), a bistable valve (15) arranged in parallel between said solenoid valves (13, 14) and said pistons (12a, 12b), a control valve (16) arranged on the pressure side of said pumps (10) toward the discharge line leading to the reservoir (11) and equipped with an adjusting device (17), comprising a spring element (18), that is linked to said bistable valve (15), **characterized in** that it comprises a shuttle-type sequence valve (19) on the link between the spring element (18) of said adjusting device (17) and the supply line of said solenoid valves (13, 14) or said bistable valve (15), whereby this bistable valve (15) is also linked to the hydraulic control (20) of said sequence valve (19), whereby said adjusting device (17) is linked to the pressure side of said pumps (10), and a valve (21) arranged in a selected section of the link (22) between said sequence valve (19) and said bistable valve (15) or of the link (23) between the sequence valve (19) and said spring element (18) of said adjusting device (17), whereby the function of this valve (21) is to produce a preset pressure drop between the spring element (18) of said adjusting device (17) and the bistable valve (15).

2. Device for the optimization of hydraulically controlled engagement of marine transmission clutches comprising a pump (10) for the delivery of hydraulic fluid from a reservoir (11) to two control pistons (12a, 12b) of said clutches, two solenoid valves (13, 14) arranged between said pump (10) and said pistons (12a, 12b), a bistable valve (15) arranged in parallel between said solenoid valves (13, 14) and said pistons (12a, 12b), a control valve (16) ar-

ZF FRIEDRICHSHAFEN AG
Friedrichshafen

ranged on the pressure side of said pumps (10) toward the discharge line leading to the reservoir (11) and equipped with an adjusting device (17), comprising a spring element (18), that is linked to said bistable valve (15), **characterized** in that it comprises a shuttle-type sequence valve (19) on the link between the spring element (18) of said adjusting device (17) and the supply line of said solenoid valves (13, 14) or said bistable valve (15), whereby this bistable valve (15) is also linked to the hydraulic control (20) of said sequence valve (19), whereby said adjusting device (17) is linked to the pressure side of said pumps (10), and a suitable arrangement of lines through which a throttling effect is made possible, whereby the function of this lines is to produce a preset pressure drop between the spring element (18) of said adjusting device (17) and the bistable valve (15).

(Weiter auf Blatt 15 der ursprünglich eingereichten Unterlagen.)

3. A device in accordance with claim 1 characterized in that the preset pressure drop is technically produced by means of a suitable arrangement of lines, through which a throt-tling or similar effect is made possible.

4. A device for the optimization of hydraulically controlled engagement of clutches used in marine transmissions in accordance with one or several of the preceding claims, charac-terized in that it conforms to the descriptions and illustrations on the sketches enclosed.